UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER
CHANG, SUNRAY

ART UNIT	PAPER NUMBER
2121	

DATE MAILED: 12/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

		Application No.	Applicant(s)
Office Action Summary		09/671,740	SHIBAZAKI, MITSUHIRO
		Examiner	Art Unit
		Sunray Chang	2121

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 August 2005*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-9* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1.   This office action is in responsive to the paper filed on August 31ˢᵗ, 2005.

Claims 1 – 4 and 6 – 9 are presented for examination.

Claims 1 – 4 and 6 – 9 are rejected.

Claim Objections

2.   Claims 1 – 4 and 6 – 9 are objected to because of the following informalities: applicant

claims for generating regular N-polygonal figures is not supported by applicant's specification

and drawings, "rounded polygonal figures" should be used to replace "regular polygonal

figures". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3.   **Claims 3 and 8 are rejected under 35 U.S.C. 112, first paragraph, as failing to**

comply with the enablement requirement. The claim(s) contains subject matter which was

not described in the specification in such a way as to enable one skilled in the art to which it

pertains, or with which it is most nearly connected, to make and/or use the invention.

Specifically, independent claims include limitations drawn to drilling means. But the

specification does not disclose the methodology for actually how to form a N-polygonal figure

using a (N+1) figure. No algorithms, techniques or flow charts are disclosed. While directing

back to specification, for example, makes references to, pages 21 – 35. Applicant's specification

appears to be drawn entirely to procedures of single point forming N-polygonal figures.

Applicants have not disclosed specifically how to form a N-polygonal figure using a (N+1)

polygonal figure. Such that one skilled in the art could make and/or use the claimed invention

without undue experimentation.

References, Charles T. Thompson (U.S. Patent No. 3,599,736, Col. 1, Lines 51 – 54),

Roger J. Morrell et al. (U.S. Patent No. 4,074,778, Abstract, Col. 1 and 2) and Chen-Kang David

Chen (U.S. Patent No. 5,864,058, Col. 7, Lines 46 – 47) have been cited by examiner for further

explains it is well known that the lobed cutting tools tend to cut polygonal holes having one more

side than the number of lobes of the tool, three-lobed tools tend to drill square holes; four-lobed

tools tend to drill pentagonal holes; and so on. Thus it is considered to be known persons of

ordinary skill in the art that an (N + 1) sided tool will cut an (N+2) polygon.

4.   **Claims 3 and 8 are rejected under 35 U.S.C. 112, first paragraph, as failing to
comply with the written description requirement. The claim(s) contains subject matter
which was not described in the specification in such a way as to reasonably convey to one
skilled in the relevant art that the inventor(s), at the time the application was filed, had
possession of the claimed invention.**

Specifically, independent claims include limitations drawn to drilling means. But the

specification does not disclose the methodology for actually how to form a N-polygonal figure

using a (N+1) figure. No algorithms, techniques or flow charts are disclosed. While directing

back to specification, for example, makes references to, pages 21 – 35. Applicant's specification

appears to be drawn entirely to procedures of single point forming N-polygonal figures.

Applicants have not disclosed specifically how to form a N-polygonal figure using a (N+1)

polygonal figure. Accordingly, a skilled artisan would not know how to make and/or use the

claimed invention from the written description contained in the specification.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
> subject matter which the applicant regards as his invention.

5.   Claims 3 and 8 are rejected under 35 U.S.C. 112, second paragraph, as failing to set forth

the subject matter which applicant(s) regard as their invention.

The term, "forming a N-polygonal figure using a (N+1) figure", in claims 3 and 8 is

vague and indefinite. Because the term, "form a N-polygonal figure using a (N+1) figure", are

not defined by the claim, the specification does not provide a standard for ascertaining the

requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the

scope of the invention.

References, Charles T. Thompson (U.S. Patent No. 3,599,736, Col. 1, Lines 51 – 54),

Roger J. Morrell et al. (U.S. Patent No. 4,074,778, Abstract, Col. 1 and 2) and Chen-Kang David

Chen (U.S. Patent No. 5,864,058, Col. 7, Lines 46 – 47) have been cited by examiner for further

explains it is well known that the lobed cutting tools tend to cut polygonal holes having one more

side than the number of lobes of the tool, three-lobed tools tend to drill square holes; four-lobed

tools tend to drill pentagonal holes; and so on. Thus it is considered to be known persons of

ordinary skill in the art that an (N + 1) sided tool will cut an (N+2) polygon.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459

(1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating obviousness
     or nonobviousness.

6.   **Claims 1 – 4 and 6 – 9 are rejected** under 35 U.S.C. 103(a) as being unpatentable over

Yoshihiko Kimura [JP 406304805, (forth office action cited) and referred to as **Kimura**

hereinafter], and in view of David P. Little (SpiroGraph, http://www.math.dartmouth.edu/

~dlittle/java/SpiroGraph/, 1997, and referred to as **Little** hereinafter).

(**Kimura** as set forth above generally discloses the basic inventions.)

Regarding independent claims 1, 4, 6 and 9,

      Kimura teaches, boring a hole having a shape [form a square shape hole] defined by the contour of the regular N-polygonal figure [square]. [Abstract, Fig. 2 – 12]

      Kimura does not teach,

- The center point (S) of a regular N – polygonal figure to be determined is set as a fixed point; a point, which is distant by a certain length from the said center point (S) and revolves around the center point (S), is set as a first point (E); a point, which is distant by a certain length from the first point (E) and revolves around the first point (E), is set as a second point (M);

- The second point (M) revolves around the first point (E) at an angular velocity ω, that the first point (E) revolves around the center point (S) at an angular velocity $(1 - N)\,\omega$, that the first point (E) is away from the center point (S) by a distance (r), and that the second point (M) is away from the first point (E) by a distance $(N - 1)^2\, r$, the locus of the second point (M) defines a contour of a regular N – polygonal figure to be determined being circumscribed on a circle having a radius N (N – 2) r.

      Little teaches,

- the center point (S) [origin, Line 18, Page 1] of a regular N – polygonal figure [Square in Fig. 1, Page 2] to be determined is set as a fixed point [origin, Line 18, Page 1]; a point [(R + r, 0), Line 20, Page 1], which is distant by a certain length [R + r, Line 20, Page 1] from the said center point (S) [origin, Line 18, Page 1] and revolves around [large circuit in Fig. 1, Page 2] the center point (S) [origin, Line 18, Page 1], is set as a first point (E) [(R + r, 0), Line 20, Page 1]; a point [reflector, Line 22, Page 1], which is distant by a certain length [Distance of Point, Line 22, Page 1] from the first point (E) [(R + r, 0), Line 20, Page 1] and

revolves around [small circuit in Fig. 1, Page 2] the first point (E) [(R + r, 0), Line 20, Page 1], is set as a second point (M) [reflector, Line 22, Page 1];

- Further, **Little** teaches the second point (M) revolves around the first point (E) at an angular velocity ω, that the first point (E) revolves around the center point (S) at an angular velocity $(1 - N)$ ω, that the first point (E) is away from the center point (S) by a distance (r), and that the second point (M) is away from the first point (E) by a distance $(N - 1)^2$ r, the locus of the second point (M) defines a contour of a regular N – polygonal figure to be determined being circumscribed on a circle having a radius N (N – 2) r.

By

$$X(t) = (R + r) \cos(t) - p \times \cos((R + r) t / r)$$

$$Y(t) = (R + r) \sin(t) - p \times \sin((R + r) t / r)$$

Multiplied by a constant angular velocity ω

$$\theta = \omega t$$

(Note: Function in the time domain are the same when written in the frequency domain and Official Notice is taken of this fact.)

We can get

$$X(\theta) = (R + r) \cos(\theta) - p \times \cos((R + r) \theta / r)$$

$$Y(\theta) = (R + r) \sin(\theta) - p \times \sin((R + r) \theta / r)$$

Base on

Second point (M) revolves around first point (E) at angular velocity ω

First point (E) is away from the center point (S) by a distance (r)

According to the value of k = 1 – N is a result of the initial value being set to 2π – (2π / N) which is an arbitrary value. It is inherent for a person with ordinary skill in the art to get the same results as:

- Angular velocity of the first point (M) is (1 – N) ω is constant.

- Second point (M) is away from first point (E) by distance $(N – 1)^2$ r which is derived from the initial value of 2π – (2π / N).

- The locus of the second point (M) defines a contour of a regular N – polygonal figure to be determined being circumscribed on a circle having radius N (N – 2) r which is derived from the initial value of 2π – (2π / N).

- The contour of the N-polygonal figure can be defined by a function f (θ); the function f (θ) is a one-valued function; the function f (θ) is a periodic function with a period 2π / N; the function f (θ) has one maximum value and one minimum value in one period, the function f (θ) has line symmetry with respect to the center of the minimum point between the two maximum points, in regard to one period from a maximum point to the next maximum point of the function f (θ); and the function f (θ) has a positive curvature or no curvature. [X(t) = (R + r) cos(t) – p x cos((R + r) t / r); Y(t) = (R + r) sin (t) – p x sin ((R + r) t / r), sinusoid functions are well known with this features, see further official notice mathworld.wolfram.com]

It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to modify the teaching of **Kimura** as taught by **Little** to include "The center point (S) of a regular N – polygonal figure to be determined is set as a fixed point; a point, which is distant by a certain length from the said center point (S) and revolves around the center point (S), is set as a first point (E); a point, which is distant by a certain length from the first point (E) and revolves around the first point (E), is set as a second point (M); The second point

(M) revolves around the first point (E) at an angular velocity ω, that the first point (E) revolves around the center point (S) at an angular velocity $(1 - N)$ ω, that the first point (E) is away from the center point (S) by a distance (r), and that the second point (M) is away from the first point (E) by a distance $(N - 1)^2$ r, the locus of the second point (M) defines a contour of a regular N – polygonal figure to be determined being circumscribed on a circle having a radius $N (N - 2)$ r" for the purpose of creating a square shape.

Regarding independent claims 2, 3, 7 and 8,

Based on forth rejections to independent claims 1, 4, 6 and 9, **Kimura** further teaches forming N-polygonal figures using $(N - 1)$-polygonal figures [Fig. 2 – 14]

Response to Amendment

Claim Rejections - 35 USC § 102

7.   Applicants' argument regarding "Round square, Radius 1 is 60, Radius 2 is –45, Position is 101 do not correspond to the above-mentioned features" [Page 16, lines 1 – 3] is disagreed with. The Little reference teaches a tool for forming any different kind of polygon by the combinations of different R1, R2 and Position. The examiner provides R1 is 60, R2 is –45 and the Position is 135 which is used in applicant's limitation $(N-1)^2$ r.

Conclusion

8.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Sunray Chang whose telephone number is (571) 272-3682. The

examiner can normally be reached on M-F 7:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Anthony Knight can be reached on (571) 272-3687. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is 703-746-3506.

Anthony Knight
Supervisory Patent Examiner
Group 3600

Sunray Chang
Patent Examiner
Group Art Unit 2121
Technology Center 2100
U.S. Patent and Trademark Office

December 7, 2005